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**Iwasaki**

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(54) **LIGHTING FIXTURE FOR VEHICLE**

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(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,972,307 A 11/1990 Takatsuji et al.  
8,007,150 B2\* 8/2011 Yagi ..... **F21S 48/1154**  
362/520

(Continued)

FOREIGN PATENT DOCUMENTS

DE 34 17 034 A1 11/1985

DE 10 2005 030 932 A1 1/2007

(Continued)

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(57)

**ABSTRACT**

It is difficult to efficiently control and design light distribution in the conventional lighting fixture for a vehicle. The present invention is provided with a semiconductor-type light source (2) and a lens (3). The lens (3) is configured from a first lens part (31), a second lens part (32), and a third lens part (33). A light-collecting pattern (SP) is formed in the first lens part (31). A first diffusing pattern (DWP) is formed in the second lens part (32). A second diffusing pattern (UWP) is formed in the third lens part (33). As a result, light distribution can be efficiently controlled and designed in the present invention.

**7 Claims, 8 Drawing Sheets**

